OPERATION AND SERVICE MANUAL

MODEL 30 INVERTER

FEBRUARY 1967

AUSTRON, Inc.
10214 North Interregional
Austin, Texas 78753
512-454-2581

WARRANTY

AUSTRON, Inc., warrants that each product manufactured by them is free of defects in material and workmanship. Their obligation under this warranty is limited to repairing or replacing any product or parts thereof, which shall be returned to them by the original purchaser, transportation charges prepaid, when upon their examination, it is disclosed to their satisfaction to be defective. This warranty is effective for one year after delivery to the original purchaser. If the fault has been caused by misuse or abnormal conditions of operation, repair will be made at cost. In this case, an estimate will be submitted before work is begun.

If any fault develops, AUSTRON, Inc., should be notified, giving full details including Model Number and Serial Number. They will then notify original purchaser of the disposition of the defective product.

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1.0 INTRODUCTION

The Model 30 Inverter is designed for use where power is required which is precisely controlled in frequency and is well regulated in voltage and wave form. It operates from unregulated 48-72 Hz or 340-460 Hz, 115 VAC input and supplies precisely regulated 60 Hz or 400 Hz sinewave power controlled in frequency by an internal standard.

2.0 GENERAL DESCRIPTION

The front view of the Model 30 is shown in Figure 1. Rear view is shown in Figure 2. Front panel controls include input power switch, output power switch and a voltage control. A meter monitors output voltage. Pilot lamps indicate power available. A fuse on the rear panel protects the input. The output is protected by automatic shutdown with overload. The Power Module rectifies and filters the input AC power and applies 45 VDC to the output power stages, driver stages and 12 VDC to the frequency standard. The frequency standard applies a precise reference to the driver stages where it is filtered to produce a sinewave, amplified to the desired level and applied to the output transformer. Feedback circuits regulate the voltage level. A current sensing transformer triggers an SCR across the drive to shut down the inverter when output current exceeds the rating of the power stage. Output voltage remains at zero until the output switch is manually recycled.

3.0 SPECIFICATIONS

Output Frequency:	60 Hz (400 Hz or special order)
Output Frequency Tolerance:	±0.1% ±0.01% ±0.001% $\pm 5 \times 10^{-7}$ per day $\pm 1 \times 10^{-8}$ per day
Output Load:	250 VA, 0.7 to 1.0 power factor
Output Wave Shape:	Sinewave with less than 1% total harmonic distortion
Output Regulation:	±0.1% for input line variation of ±10% ±0.1% for no load to full load ±0.1% for -20°C to 70°C ambient
Output Voltage:	118 VRMS (105 to 125 VRMS adjustable)
Operating Temperature:	-20°C to 70°C ambient
Storage Temperature:	-50°C to 100°C
Overload and Short Circuit Protection:	Internal automatic circuitry, resetable on front panel
Remote Sensing:	Connections on output plug
Input Voltages:	118 VAC ±10%, 220 VAC ±10%
Input Frequency:	48-72 Hz or 340 to 460 Hz
Size:	Rack Mount - 19" wide, 5 1/4" high, 14 3/4" deep Bench Mount - 17" wide, 5 1/4" high, 14 3/4" deep
Weight:	40 to 60 pounds, depending on type.

4.0 INSTALLATION

The installation of the Model 30 is limited to wiring up mating input (J1) and output (J2) connectors and installing unit in a rack if rack mounted. Plug input cable into local AC receptical furnishing 118 VAC (or 220 VAC) 48-72 Hz, connect output to load and turn input switch to ON. Input lamp should appear.

NOTE: Inverter will be wired for 118 VAC or 220 VAC. Unit will be tagged for proper voltage. To convert from one input voltage to the other, see schematics.

Turn output switch to ON. Output lamp should light and power should be applied to the load. Adjust pot on front panel to set output to desired level while monitoring voltage on front panel meter.

5.0 THEORY OF OPERATION

5.1 DC Power Sources (See Schematic 80245)

5.1.1 AC Power is brought in at connector J1 where it is filtered by line filters C2A and C2B. Fuse F1 protects the unit against internal shorts. AC power is applied to transformer T2 via switch S2. AC power is monitored by DS1. Taps on T2 allow for either 115 VAC or 230 VAC input power. For 115 VAC input, connect terminal 1 to 3 and 2 to 4. Connect input power to 1 and 2. For 230 VAC input, connect terminal 2 to 3 and apply power to 1 and 4. The blower and DS1 are permanently connected across terminals 3 and 4.

5.1.2 The secondary of T2 is connected to two full wave bridge rectifiers for high and low voltage DC supplies. The high voltage supply consists of diodes CR5, CR6, CR7, and CR8, filter L1 and C4 and bleeder resistor R13. The high voltage, 45 VDC, is supplied to the power amplifier stage which will be described later.

5.1.3 The low voltage regulated supply consists of bridge rectifier assembly, CR9 and two regulator circuits. A 25 VDC regulator consists of resistor R15, zener VR3, and filter capacitor C5. A 12 VDC regulator consists of resistor R16 and zener VR4.

5.1.4 Regulated 25 VDC is supplied to PCB at pins C and Y. Twelve volts DC is supplied to pin 4 of the frequency standard XY-1.

5.2 Wave Shaping and Voltage Control (See Schematic 80251)

5.2.1 Reference frequency is supplied to the unit via a reference oscillator at connector XY-1. This reference may be a tuning fork, a crystal or other reference as required. The reference frequency 60 Hz square wave, is made available to the PCB via pin 8 of connector XY-1 and pin V of PCB connector.

5.2.2 The 60 Hz reference is capacitor coupled through C3 and base resistor R13 to amplifier Q8. Biasing for this amplifier is supplied through diode, CR2. The amplified 60 Hz square wave is fed to emitter follower Q9 and to a filter network made up of L1, L2, C5, C7, and C9. The filtered 60 Hz sinewave is capacitor coupled through C8 to amplifier Q11. R28 and C11 decouple the emitter from ground and R25 furnishes base bias. The output from this amplifier is applied to emitter follower Q12. The output of Q12 is supplied to transformer T1 through C13 and is also fed back to the base of Q11 through a modified 60 Hz twin-tee notch filter made up of R27, R29, R32, and C10 and C12. This negative feedback tends to suppress all frequencies outside the 60 Hz notch and leaves the 60 Hz fundamental unaffected. The resulting signal applied to T1 is an improved sinewave. The output of T1 will be discussed in paragraph 5.3, Drivers.

5.2.3 Voltage feedback is provided from the output, pins B & E of J2 (See Schematic 80245) through resistors R17 and R18 on PCB No. 2 to isolation transformer T4. In the event remote sensing is desired, pins D and E, J2 are connected together and pins B and C, J2 are connected together at the load. This shorts R17 and R18 and provides voltage sensing at the load, thus eliminating drop in lines between J2 and the load.

5.2.4 The output voltage is supplied from transformer T4 to the bridge rectifier assembly CR1 on the PCB through pins P and R of the PCB connector. The rectified voltage is filtered by C1 and supplied through R6 and R7 to one end of potentiometer R19 on the chassis through pin X of the PCB connector. The other side of R19 is returned to ground through pin V of the PCB connector and resistors R15 and R16. The wiper

of R19 is applied, through pin Z of the PCB connector, to the base of Q4. This DC voltage is proportional to the AC output voltage at J2 (or at the load) and may be varied by potentiometer R19 which is on the front panel.

5.2.5 Voltage regulation is provided by the following network. The DC voltage applied to the base of Q4, as described above, is proportional to the AC output of the inverter Q4 and Q2 make up a differential amplifier with current sources Q4 and Q5 supplying constant current to the collector of Q4 and the common emitters of Q2 and Q4. Zener diodes VR3 and VR4 set the base reference at 3.3 VDC for these two current sources. VR3 also sets the base reference of Q1 which is a current source for the two zeners VR1 and VR2. VR1 and VR2 establish a base reference at Q2 of 9.4 VDC (4.7 V each). The output of this network is the collector of Q4. This output is a fixed voltage (about 15 VDC) depending on the location of the wiper of R19. If the output AC voltage into the load tends to drop, the voltage at the base of Q4 falls, tending to cut off Q4. The collector voltage will rise by the difference between the two bases of Q2 and Q4. This increased voltage is filtered by C2 and applied through two emitter followers Q6 and Q7 to the collector of Q8. Q8 is switched off and on by the oscillator input as previously described, producing a square wave whose peak-to-peak voltage is controlled by the collector voltage. The driving voltage is therefore constrained to remain at the point set by R19. Due to the presence of the zener references and current sources for the differential amplifier, the voltage supplied to the collector of Q8 is very closely controlled and very stable in the presence of varying conditions of temperature and line voltage.

5.3 Drivers

5.3.1 The output of T1 on the PCB (See Schematic 80251) is applied to the driver transistors Q1 and Q2 on the chassis (see Schematic 80245) through the circuit shown in Figure 3. Sinewave drive signal is supplied to driver transistors Q1 and Q2 through bias-balancing network composed of VR6 and R30 to supply 3.3 V biasing voltage and balancing pot R33. A winding of output transformer T3 is in series with the drive and phased to provide negative feedback to further reduce distortion.

Balancing control R33 establishes equal bias on Q1 and Q2 so that the two are balanced.

5.3.2 Q1 and Q2 are push-pull amplifiers with B+ supplied to the centertap of T1. C1 and R1 across the collectors of Q1 and Q2 prevent high frequency distortion. T1 couples the output to a second stage of driver transistors Q3 and Q8. The bases of Q3 and Q8 are biased above ground by the network CR1 and CR2 and R2. This prevents crossover distortion in the output stage due to the double base to emitter potential of Q3, Q4, and Q8, Q9. CR4 prevents reverse biasing of the base to emitter junction of Q3 and CR3 performs a similar function for Q8. R3 and R4 provides current feedback to the bases of the output transistors Q4-Q7 and Q9-Q12. This assures turnoff in the presence of leakage.

5.4 Power Stage

5.4.1 A series, push-pull output stage is made up of transistors Q4-Q7 and Q9-Q12 and their emitter resistors. The emitter resistors insure current sharing of the paralleled transistors. B+ is supplied to the collectors and ground return is through the centertap of the power winding of T3.

5.4.2 Protection against spikes on the DC bus which might exceed the emitter to collector breakdown potential of the transistors in the output stage is provided by zeners VR1 and VR2.

5.4.3 A "bootstrap" winding on transformer T3 is used to insure adequate drive from Q3 and Q8. B+ is supplied to the collectors of Q3 and Q8 through the center tap of this winding. Phasing is such that, when Q4-Q7 are on a positive component provided by the winding is added to the B+, raising the collector of Q3 above the collectors of Q4-Q7 by that amount. This insures that Q3 always supplies sufficient drive to the power stage.

5.4.4 The AC power output from the secondary of T3 is applied to J2 through switch S1 and the primary of T5, the current sensing transformer. The output voltage is monitored by lamp DS2 and meter M-1.

5.5 Overload and Short Circuit Protection

5.5.1 Current sensing transformer T5 provides an AC voltage from its secondary which is proportional to current or load on the output transformer. This voltage is applied to Rectifier Assembly CR3 through pins S and T of the PCB connector. The output of CR3 is filtered by C6 and applies a positive voltage to VR5. When the zener potential of VR5 is reached, VR5 begins to conduct, turning Q10 on. Q10 draws emitter current through the gate of SCR1 firing it. Filter C4 and R12 prevent extraneous signals from firing SCR-1.

5.5.2 When SCR-1 fires, it shorts the collector of Q6 to ground, removing the drive from the power stage and shutting down the inverter. When the inverter goes down, the signal which originally turned on Q10 is removed, however, the SCR is self-latching and will continue to conduct until the anode and cathode are returned to the same potential. This is accomplished by momentarily setting S1 to OFF. The lower contacts of S1, when it is in the OFF position, short the anode of the SCR to ground through pin W of the PCB connector, turning the SCR off. When S1 is returned to the ON position, normal operation is restored unless the overload condition remains, in which case the inverter simply goes off again.

6.0 REPLACEABLE PARTS

6.1 Federal Supply Code Numbers for Manufacturers

6.1.1 For convenience in ordering replacement parts from local supply sources, the manufacturer's name (coded acording to the Federal Supply Code for Manufacturer's), address and supply code number is listed.

04713	Motorola Semiconductor Products, Inc., 5005 East McDowell, Phoenix, Arizona 85008.
75915	Littlefuse, Inc., 800 East Northwest Highway, Des Plaines, Illinois 60016.
70309	Allied Control Company, 2 East End Avenue, New York, New York 10021.
08806	General Electric Company, Miniature Lamp Department, Nela Park, Cleveland, Ohio 44112.
37942	P. R. Mallory and Company, Inc., 3029 Washington Street, Indianapolis, Indiana 46206.
92702	IMC Magnetics, Eastern Division, 570 Main Street, Westbury, New York 11591.
56631	Standard Electric Time Company, 89 Logan Street, Springfield, Massachusetts 01101.
55814	Sola Electric Division, 1717 Busse Road, Elk Grove Village, Illinois 60007.
02735	RCA, Electronic Components and Devices, 415 South Fifth Street, Harrison, New Jersey 07029.
91929	Honeywell, Micro Switch Division, 11 West Spring Street, Freeport, Illinois 61032.
82647	Texas Instruments, Inc., Metals and Controls, 53 Forest Street, Attleboro, Massachusetts 02703.
71785	Cinch Manufacturing Company, 1026 South Homan Avenue, Chicago, Illinois 60624.
71400	Bussman Manufacturing Division, McGraw-Edison Company, University at Jefferson, St. Louis, Missouri 63107.
02660	Amphenol Connector Division, Amphenol Corporation, 1830 South 54th Avenue, Chicago, Illinois 60650.
91506	Augat, Inc., 33 Perry Avenue, Attleboro, Massachusetts, 02703.
91637	Dale Electronics, Inc., 1342 28th Avenue, Box 609, Columbus, Nebraska, 68601.
07716	Burlington Division, IRC, Inc., Box 887, Burlington, Iowa 52602.

44655	Ohmite Manufacturing Company, 3635 West Howard Street, Skokie, Illinois 60076.
24446	General Electric Company, Electronic Component Sales Operation, 1 River Road, Schenectady, New York 12305.
96312	Dialight Corporation, 60 Stewart Avenue, Brooklyn, New York 11237.
01295	Texas Instruments, Inc., Semiconductor-Components Division, P.O. Box 5012, Dallas, Texas 75080.
56289	Sprague Electric Company, 481 Marshall Street, North Adams, Massachusetts 01248.
12697	Clarostat Manufacturing Company, Inc., Washington Street, Dover, New Hampshire 03820.
14655	Cornell-Dubilier Electric Division, Federal Pacific Electric, 50 Paris Street, Newark, New Jersey 07101.
00853	Sangamo Electric Company, P. O. Box 128, Pickens, South Carolina 29671.
02660	Amphenol Corporation, Connector Division, 1830 South 54th Street, Chicago, Illinois 60650.
15605	Cutler-Hammer, Inc., 4201 North 27th Street, Milwaukee, Wisconsin 53216.
72765	Drake Manufacturing Company, 4626 North Olcott Avenue, Harwood Heights, Illinois 60656.
55026	Simpson Electric Company, 5200 West Kinzie Street, Chicago, Illinois 60644.
73293	Hughes Product Division, Hughes Aircraft, P. O. Box H, Newport Beach, California 92663.
19701	Electra Manufacturing Company, 800 North 21st, Independence, Kansas 67301.
80294	Bourns, Inc., Instrument Division, 6135 Magnolia, Riverside, California 92506.
04099	Capco Division, Textool Products, Inc., 1410 Pioneer Drive, Irving, Texas 75060.
09147	Texas Capacitor Company, Inc., 7830 Westglen Drive, Houston, Texas 77042.
05397	Union Carbide Corporation, Kemet Department, 11901 Madison Avenue, Cleveland, Ohio 44101.

6.2 To Order Replacement Parts

6.2.1 Components that show no Vendor number are replacement parts stocked by AUSTRON, Inc. To order a replacement part from AUSTRON, Inc., address order to:

AUSTRON, Inc.
10214 North Interregional Hwy
Austin, Texas 78753

Specify the following information for each part:

a) Model and serial number of the instrument from the back panel.

b) Circuit reference designator, part number, and description.

6.2.2 To order a part not listed below, add a complete description of its function and location.

6.2.3 Part numbers as shown will change occasionally as vendor items are re-evaluated or as improved components become available. The equivalent component used in current production at the time orders are received will be shipped.

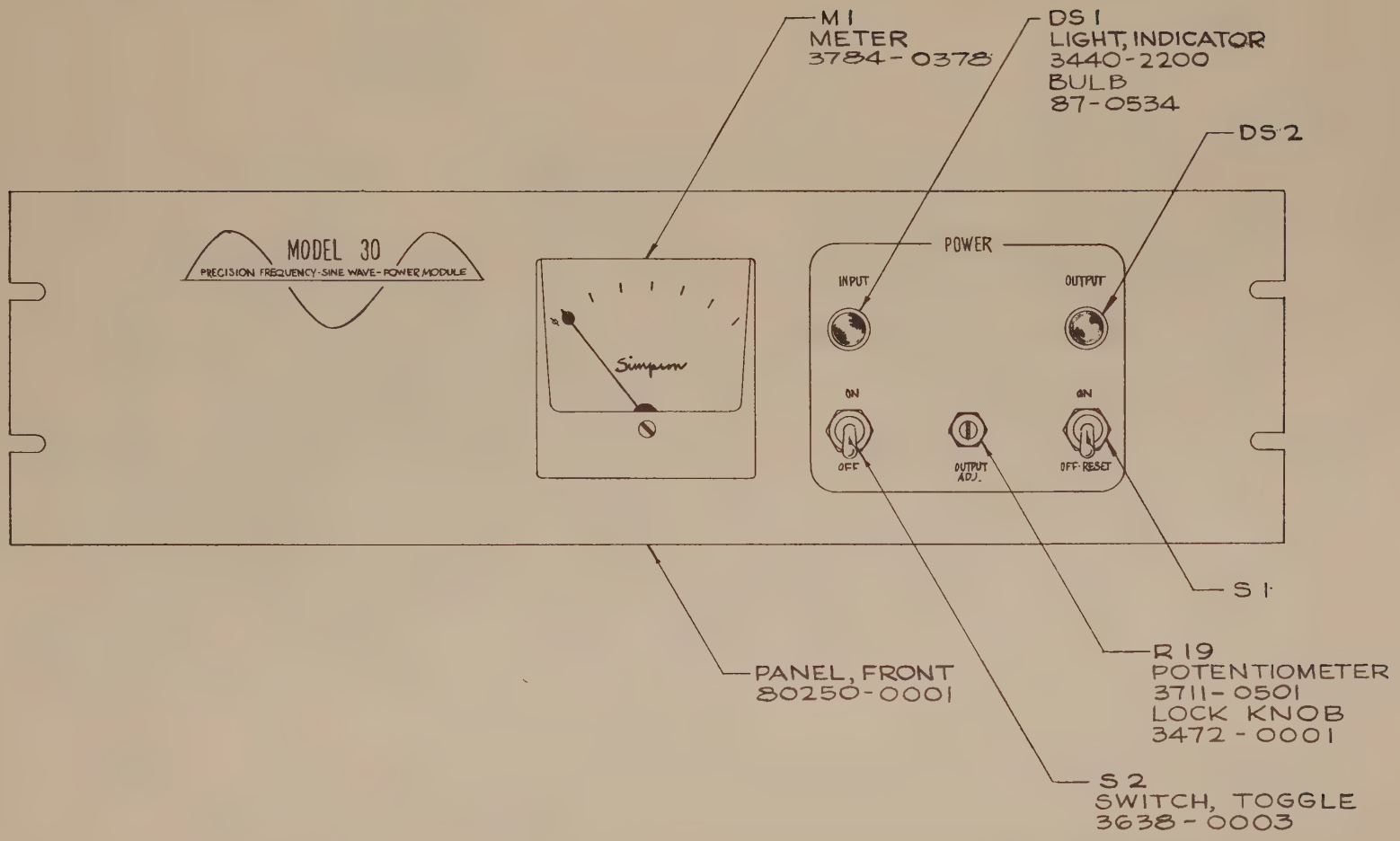
6.3 Table of Replaceable Parts

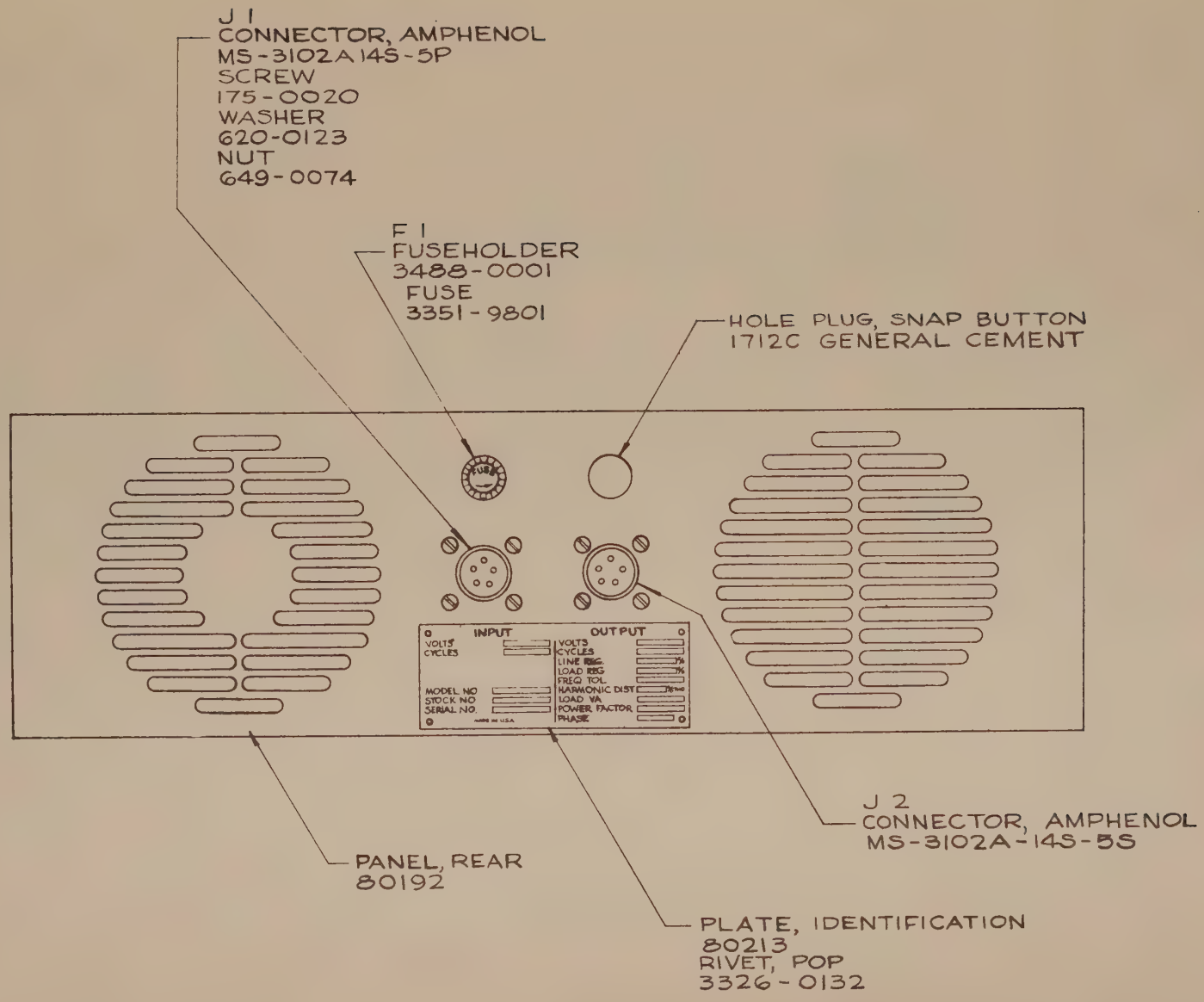
Reference Designator	Description	Vendor Code	Part Number
	6.3.1 Chassis		
Q1-Q12	Transistor		80004
	Plug, transistor	71785	2TS3
CR1-CR4	Not used		
CR5-CR8	Diode	24446	1N1185
CR9	Rectifier Assembly	04713	MDA940-4
VR1, VR2	Diode, zener	04713	1N3002A
VR3	Diode, zener	01295	1N2986A
VR4	Diode, zener	04713	1N759
R1-R12	Not used		
R13	Resistor, 100, 50 w, 1%	91637	RH50
R14	Not used		

Reference Designator	Description	Vendor Code	Part Number
R15	Resistor, 150, 25w, 1%	91637	RH25
R16	Resistor, 75, 3w, 5%	56289	242E1505
R17, R18	Resistor, 10, 1/2w, 10%	44655	RC20GF
R19	Potentiometer, 500, 2w, staper	12697	140-6526
C2	Capacitor, .05/.05, 600v	14655	60055
C4	Capacitor, 10,000, 50v	00853	539-2650-01
C5	Capacitor, 200, 150v	56289	TVL1431
T1	Transformer		80240
T2	Transformer		80233
T3	Transformer		80050
T4	Transformer		80229
T5	Transformer		3286
L1	Not used		
L2	Not used		
L3	Inductor		80002
P1	Connector	02660	MS-3106A-14S-5S
P2	Connector	02660	MS-3106A-14S-5P
J1	Connector	02660	MS-3102A-14S-5P
J2	Connector	02660	MS-3102A-14S-5S
F1	Fuseholder	71400	HKP
XF1	Fuse	71400	3AG
S1, S2	Switch, Toggle	15605	7565K6
DS1, DS2	Lampholder	72765	51-304
XDS1, XDS2	Lamp, Neon	08806	NE51H
M1	Meter, 100-130 VAC	55026	1347
	'6.3.2 PCB Assembly		80206
SCR1	Silicon Controlled Rectifier	04713	2N1595
CR1	Rectifier Assembly	04713	MDA920-4
CR2	Diode	01295	1N626
CR3	Rectifier Assembly	04713	MDA920-1
VR1, VR2	Diode, zener	73293	1N750A
VR3, VR4	Diode, zener	01295	1N746A

Reference Designator	Description	Vendor Code	Part Number
VR5	Diode, zener	04713	1N821
VR6	Diode, zener	01295	1N746A
R1	Resistor, 249, 1w		
R2	Resistor, 470, 1/2w, 10%	44655	RC20GF
R3	Resistor, 2.2K, 1/2w, 10%	44655	RC20GF
R4	Resistor, 24.9K, 1/2w, 1%	19701	TOMF7C
R5	Resistor, 12.1K, 1/2w, 1%	19701	TOMF7C
R6	Resistor, 3.3K, 3w, 5%	56289	242E3325
R7	Resistor, 18K, 5w, WW, 5%	56289	RW57G183
R8	Resistor, 2.2K, 1/2w, 10%	44655	RC20GF
R9	Resistor, 1.2K, 3w, 5%	56289	242E1225
R10	Resistor, 33K, 1/2w, 10%	44655	RC20GF
R11	Resistor, 56K, 1/2w, 10%	44655	RC20GF
R12	Resistor, 100, 1/2w, 10%	44655	RC20GF
R13	Resistor, 6.8K, 1/2w, 10%	44655	RC20GF
R14	Resistor, 3.3K, 1/2w, 10%	44655	RC20GF
R15	Resistor, 182 ohm, 1/2w, 1%	19701	TOMF7C
R16	Resistor, 1.40K, 1w, 1%		
R17	Resistor, 680, 1/2w, 10%	44655	RC20GF
R18	Resistor, 2.2K, 1/2w, 10%	44655	RC20GF
R19	Resistor, 680, 12/w, 10%	[illegible]	RC20GF
R20	Resistor, 4.7K, 12/w, 10%	[illegible]	[illegible]
R21	Resistor, 33K, 1/2w, 10%	[illegible]	[illegible]
R22	Resistor, 1.2K, 1/2w, 10%	[illegible]	[illegible]
R23	Resistor, 2.2K, 1/2w, 10%	[illegible]	[illegible]
R24	Resistor, 680, 1/2w, 10%	[illegible]	[illegible]
R25	Resistor, 2.61K, 1/2w, 1%	[illegible]	TOMF7C
R26	Resistor, 10, 3w, 5%	56289	242E1005
R27	Resistor, 2.74K, 1/2w, 1%	[illegible]	TOMF7C
R28	Resistor, 287, 1/2w, 1%	19701	TOMF7C
R29	Resistor, 6.81K, 1/2w, 1%	19701	TOMF7C
R30	Resistor, 1.21K, 1/2w, 1%	19701	TOMF7C
R31	Resistor, 5.11K, 1/2w, 1%	19701	TOMF7C

Reference Designator	Description	Vendor Code	Part Number
R32	Resistor, 12.1K, 1/2w, 1%	19701	T0MF7C
R33	Resistor, Variable, 1K, 1/2w	80294	3067S-1-102
R34	Resistor, 511, 1/2w, 1%	19701	T0MF7C
C1	Capacitor, 10 MFD, 150v	56289	TE-1507
C2	Capacitor, 6.8 MFD, 35v	56289	CS13BF685K
C3	Capacitor, 10 MFD, 35v	56289	CS13BF106K
C4	Capacitor, .1 MFD, 200v, 5%	04099	MMW
C5	Capacitor, .12 MFD, 200v, 5%	09147	Type 31
C6	Capacitor, 10 MFD, 35v	05397	J337AZ
C7	Capacitor, 1 MFD, 200v, 5%	04099	MMW
C8	Capacitor, 2 MFD, 50v, 5%	09147	315
C9	Capacitor, 1 MFD, 200v, 5%	04099	MMW
C10	Capacitor, 6.8 MFD, 35v	56289	CS13BF685K
C11	Capacitor, 120 MFD, 10v	01295	CS13BC121K
C12	Capacitor, 6.8 MFD, 35v	56289	CS13BF685K
C13	Capacitor, 100 MFD, 20v	01295	CS13BE100K
Q1	Transistor	04713	2N2905
Q2	Transistor	04713	2N2218
Q3	Transistor	04713	2N2905
Q4-Q10	Transistor	04713	2N2218
Q11	Transistor	02735	2N2270
Q12	Transistor	04713	2N2905
T1	Transformer		80238
L1	Inductor		3283
L2	Inductor		3284
	6.3.3 PCB ASSEMBLY		80197
C1	Capacitor, 1 MFD, 200v, 5%	04099	MMW
R1	Resistor, 30 1/2w, 10%	44655	RC20GF
R2	Resistor, 47, 1/2w, 10%	44655	RC20GF
R3, R4	Resistor, 120, 1/2w, 10%	44655	RC20GF
CR1, CR2	Diode	82647	G129
CR3, CR4	Diode	04713	1N4001


M1
METER
3784-0378
DS1
LIGHT, INDICATOR
3440-2200
BULB
87-0534
DS2
MODEL 30
PRECISION FREQUENCY-SINE WAVE-POWER MODULE
Simpson
POWER
INPUT
OUTPUT
ON
ON
OFF
OUTPUT ADJ.
OFF-RESET
S1
PANEL, FRONT
80250-0001
R19
POTENTIOMETER
3711-0501
LOCK KNOB
3472-0001
S2
SWITCH, TOGGLE
3638-0003


J 1
CONNECTOR, AMPHENOL
MS-3102A 14S-5P
SCREW
175-0020
WASHER
620-0123
NUT
649-0074
F 1
FUSEHOLDER
3488-0001
FUSE
3351-9801
HOLE PLUG, SNAP BUTTON
1712C GENERAL CEMENT
INPUT
VOLTS
CYCLES
MODEL NO.
STOCK NO.
SERIAL NO.
OUTPUT
VOLTS
CYCLES
LINE REG.
LOAD REG.
FREQ TOL.
HARMONIC DIST.
LOAD VA
POWER FACTOR
PHASE
J 2
CONNECTOR, AMPHENOL
MS-3102A-14S-5S
PANEL, REAR
80192
PLATE, IDENTIFICATION
80213
RIVET, POP
3326-0132

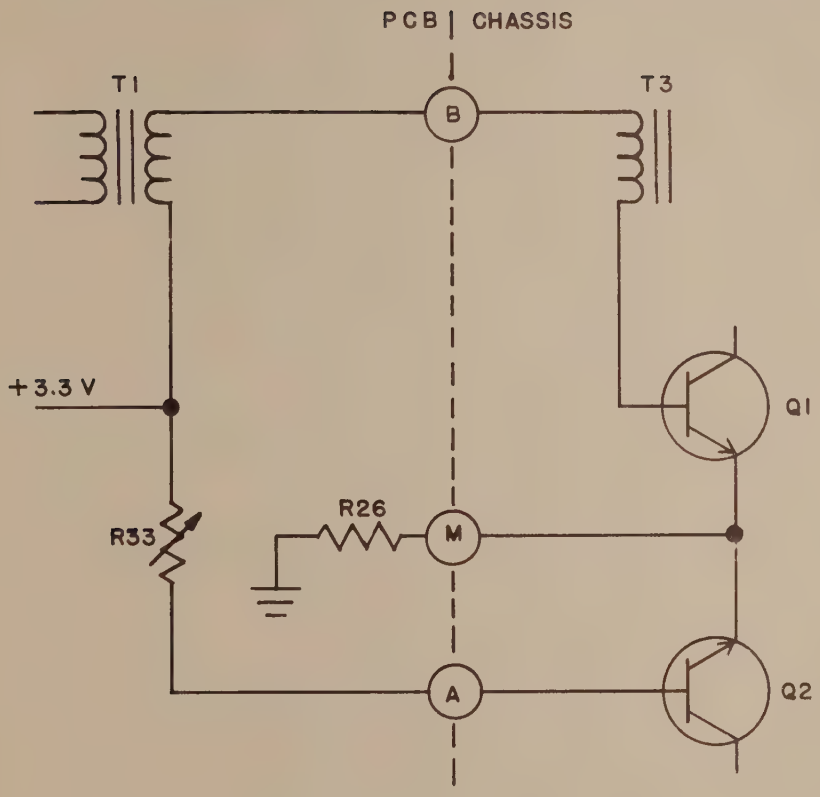


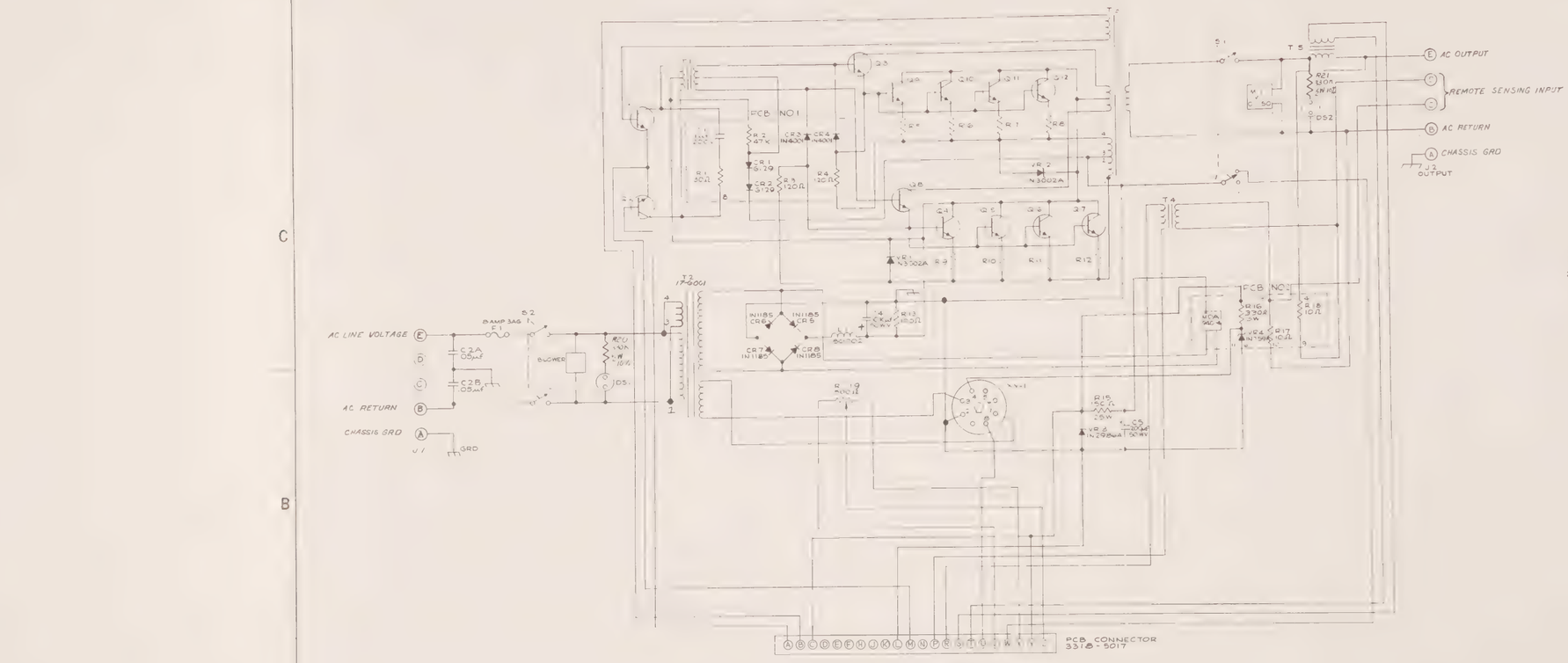
FIGURE 3
DISTORTION CONTROLLED
DRIVER CIRCUITS

7.0 SCHEMATICS

7.1 Diagram, Schematic, Crystal Control Frequency Source, Model 30 Power Module, No. 80245.

7.2 Diagram, Schematic, PCB, Model 30 Power Module, No. 80251.

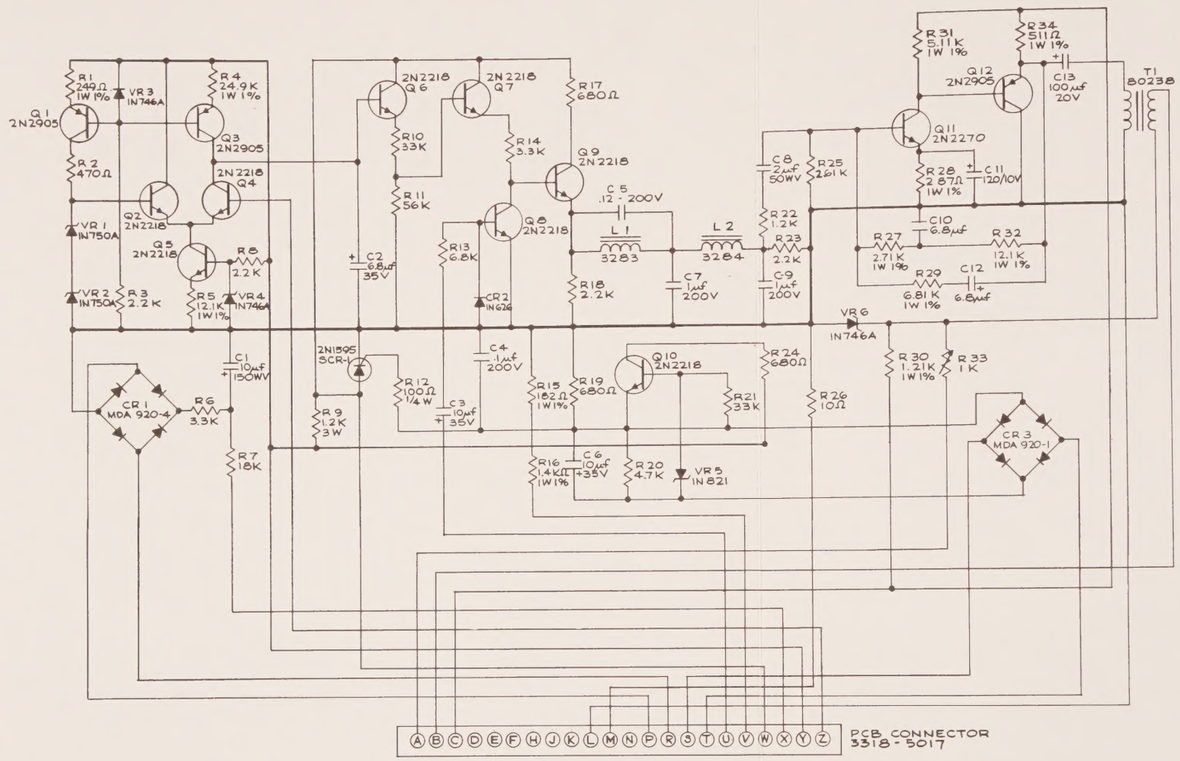
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	X1	RELEASED		
C1,C2A, C4, E5, C7, C8,C3	A	1 ADDED R20 & R21 & + SYMBOL TO C5 2 S1 SIDE TO R17 WAS N.O. 3 CONNECTED XK12 TO CR2 4 ADDED T2-3&4 WINDING 5 ADDED FUNCTIONS TO J1 & J2	4-1467	B. Bass
C7	B	1 T2 WAS 80233	4-1654	



NOTES
1. RESISTORS R5 THRU R12 ARE #14 MANGNIN WIRE AS PER DWG 80248
2 ALL TRANSISTORS ARE 80004

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DO NOT SCALE DRAWINGS		AUSTRON, INC.	
TOLERANCES: DECIMALS / FRACTIONS / ANGLES		DIAGRAM, SCHEMATIC, CRYSTAL CONTROL FREQ SOURCE, MODEL 30 POWER MODULE	
MATERIAL	ENGINEER / CHECKED JHR 10-7-65 / DRAFTSMAN BOLING 9-23-65		
NEXT ASSY / USED ON / APPLICATION		SIZE 4 / CODE IDENT NO 19397 / 80245 / 8	
		SCALE / SHEET 1	

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	X1	RELEASED		



		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DO NOT SCALE DRAWINGS	
		TOLERANCES	
		DECIMALS / FRACTIONS / ANGLES	
		MATERIAL:	
NEXT ASSY	USED ON		
APPLICATION			

ENGINEER	JSEBESTA	10-7-65
CHECKED	JHR	10-7-65
DRAFTSMAN	BOLING	9-22-65

AUSTRON, inc.

DIAGRAM, SCHEMATIC, PCB
MODEL 30 POWER MODULE

SIZE	CODE IDENT NO.		
3	19397	80251	X1
SCALE		SHEET 1	

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